

## FIVE NEW SPECIES OF PSEUDOPOTAMILLA FROM THE PACIFIC COAST OF NORTH AMERICA.

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A noteworthy portion of the Polychæta collections of the Alaskan Salmon Commission of 1903 is seven species, five of which are herein described as new, of the genus *Pseudopotamilla* recently established by Miss Bush. These new species are of interest in indicating the interrelations of *Pseudopotamilla* and other genera into which the former tends to grade. In most respects *P. intermedia* is most typical, and stands between the other species, which may be grouped in couples having quite distinct affinities. On the one hand *P. brevibranchiata* and *P. occelata* approach *Eudistylia* in the structure of the collar, and the former especially in the uncini and the latter in the numerous eyes and general habit. Neither of these, however, shows any indication of spiral coiling of the branchial bases, which are small and simple. On the other hand, *P. splendida* and *P. anoculata* have the angulated branchial stems without eyes and the more elongated spatulate thoracic setæ which characterize *Parasabella* and *Sabella*, but the dorsal collar lobes are exceptionally well developed and the branchial bases are very small and simple. The first three species have the avicular uncini of the posterior thoracic segments enlarged and otherwise peculiar, in this respect resembling *P. oculifera* Leidy.

*Pseudopotamilla brevibranchiata* sp. nov. Pl. XXXVII, figs. 1 to 7.

A species remarkable for the shortness of its branchiæ and the conspicuousness of its eyes. Two specimens containing nearly mature ova measure 55 and 58 mm. long and have 128 and 151 segments respectively. Of this length the palpi and branchial crown measure only 6 to 6.5 mm. and the thorax 8 mm. Owing to the contraction of the abdomen the form is rather short and stout, but the posterior  $\frac{1}{3}$  tapers in the usual way to the small pygidium, which bears a close aggregation of small brown eye spots dorsal to the anus.

The palpi or branchial bases are very firm and rigid, not at all produced ventrally nor spirally twisted, though slightly inflected and winged; the distal margin is even and transverse and the height uniform (about 1.5 mm.) all round. The dorsal free margin bears a rather prominent, rigid, slightly incurved wing which overlaps its fellow

medially and is separated by a deep, narrow incision from a similar but thinner wing borne upon the base of the dorsalmost branchial stem. Including a few rudimentary ventral ones and several in process of regeneration at other points, the number of branchiæ varies from 29 to 31. Owing to excessive crowding some of them are forced inward, producing an appearance of two series. The stems or radioles are remarkably short, stout, rigid and brittle and, without considering the rudimentary and regenerating ones, increase gradually in length from ventral to dorsal, the latter being about  $\frac{1}{4}$  longer than fully developed ventral ones. Although the outer face is round, the basal  $\frac{1}{3}$  or so, distally to the position of the first eye, bears a pair of very low lateral wings or margins which are united for a very short distance at the base. Beyond this point the stems are laterally compressed. The barbs are also thick and brittle, closely two-ranked, and all short, the longest proximal ones not exceeding 3 times the diameter of the stem and the distal ones being much shorter. When fully developed they continue nearly to the end, leaving free a short thick tip only. Eyes are exclusively in one series on the side of the stem nearest to the dorso-median line. They are deep purplish-brown and very conspicuous, and confined to a zone comprising the middle half of the branchiæ, but most irregularly arranged on individual branchiæ, on which they seldom occupy the entire width of the zone, though they may be variously scattered, or crowded into one or more groups. The usual number has 4 or 5, but varies from 2 to 9, and they may equal  $\frac{1}{2}$  the diameter of the stem or be minute, scarcely visible specks, and all or any number may be large or small.

A high oral membrane with rumpled, sinuous margins begins ventrally at the sides of the mouth, is reflected on itself and passes around the internal bases of the branchiæ to become continuous dorsally with the large, much folded, foliaceous tentacles.

The peristomial collar differs considerably from the structure typical of the genus, as exemplified by *P. reniformis* and *P. oculifera*, and indicates the method of transition between forms with the collar lobes widely separated and those with them in contact dorsally. The dorsal portion consists of a pair of very low folds reflected into the dorsal fissure and there coming into contact. These are continuous with the remainder of the collar which rises abruptly into a pair of rounded lobes just above the collar setæ. From this point it is high and regular to near the median ventral region, where a wide open notch on each side partly separates the slender, pointed ventral lobes which are divided from each other by the deep ventral fissure.

Besides the peristomium there are 8 setigerous thoracic somites, all uniannulate and separated by deep segmental furrows. The region is nearly cylindrical, but slightly depressed and from 3 to 3.5 mm. wide. The 8 ventral glandular plates, including the first, are all transversely oblong and the second and third only are divided transversely into 2 equal halves. Abdominal somites are also uniannulate and the posterior ones much crowded. Thick ventral plates are developed throughout the region and are divided into halves by a deep faecal groove extending from the anus to the first abdominal segment, cutting the latter obliquely to the right and entering the thoracico-abdominal furrow in front of the setæ, then appearing again faintly in the dorsal mid-line of the thorax and entering the dorsal fissure.

Thoracic parapodia are strictly lateral and the uncinigerous tori flush with the surface, while the setigerous tubercles may project slightly or be retracted within little pockets. The collar setæ form a very small tuft and the remaining 7 fascicles are somewhat elongated laterally and oblique. On all thoracic somites the uncinigerous tori are separated ventrally by about  $\frac{1}{6}$  and dorsally by nearly or quite  $\frac{1}{2}$  the body circumference. They increase in length gradually to the third which equals the ventral interspace, then decrease to the last which is  $\frac{2}{3}$  of the longest, while the first equals the fifth or sixth. As the tori shorten the setæ tufts, closely approximated to their dorsal ends, assume a correspondingly lower position. Abdominal parapodia are more prominent and distinct lateral elevations, highest at the position of the setæ tufts near their ventral ends. The anterior tori are, like the thoracic ones, nearly flush with the surface and are consequently transitional, but, like all of the others, they are separated from the ventral plates by a deep longitudinal groove. Both setæ and uncini are in strictly vertical, linear series. On the first abdominal segment the former has a length of about  $\frac{1}{2}$  that of the setæ tuft, and the latter equals the uncinigerous torus of the last thoracic somite. From this point both gradually diminish in length and number of setæ or uncini to the caudal end. At the dorsal end of each thoracic and the ventral end of each abdominal torus is a small, eye-like pigment spot.

In the collar tuft all setæ are capillary, winged, lanceolate, the ventral ones, however, shorter and with wider wings than the dorsal. On the remaining thoracic somites the setæ are of two sorts; a few in the dorsal and anterior part of the fascicle resemble the collar setæ (fig. 1), the number of which decreases from anterior segments backward. Those in the ventral and posterior portions of the bundle form a compact phalanx of several rows of obovate paddle-shaped or spatulate

setæ with mucronate tips and the broad blades curved and often slightly asymmetrical (fig. 3). Abdominal setæ are all capillary with the shaft bent at the widest portion of the short double asymmetrical blades. They are arranged in two vertical rows, those in the anterior (fig. 2) having very long, attenuated, smooth tips, the posterior much shorter but otherwise similar. Their number varies from 24 in anterior to 4 or 5 in posterior fascicles. All setæ are distinctly striated.

Thoracic tori bear avicular uncini in the posterior and pick-shaped setæ in the anterior rank, the number of each on somite VI being 65 and on IX 40. The former (fig. 4) have a rather long slender base, narrow but prominent breast, thick erect neck, and little expanded head, with the prominent, finely divided crest pushed well forward and its frontal margin forming a perfectly straight profile with the acute beak, which is just perceptibly bent forward at the tip. On the posterior thoracic somites the uncini are somewhat larger, but the difference is not so great as in *P. ocellata* and *P. intermedia*; the neck is also more craned forward and there are other slight peculiarities. The latter (figs. 6 and 7) have slender, finely striated stems slightly curved near the end, and expanded into a coarsely striated head enclosed in a sheath inflated at the base, and prolonged nearly at right angles to the stem into a moderately elongated slender process. Abdominal tori contain avicular uncini only (fig. 5), smaller than the thoracic uncini which they resemble in many respects, but have much the form of the wooden decoys used in duck shooting.

Except for the caudal eyes, the minute spots at the ends of the tori and a trace of brown on the median dorsal portion of the collar, no pigment exists on the body, which is of a pale yellowish color. On one specimen the basal half of the branchial wreath has no pigment, but in the distal half are four partly coalescent bands of brown, not extending on to the back of the stems, but deep-colored on the sides of the latter and the basal half of the barbs. When the branchiæ are opened up the barbs of the concealed branchiæ are found to be of a beautiful orange in those parts from which pigment is absent. The second specimen has very little pigment showing on the exterior except narrow longitudinal streaks of brown on the branchial base corresponding with the intervals between branchiæ. When opened up the distal half of the branchiæ shows traces of orange on the barbs, while the basal half is of a nearly solid orange brown.

The tubes are rather thick, tough and horn brown, and are thickly covered with fine sand; the free end is collapsible for a considerable distance.

This species presents an interesting combination of characters which weaken one's faith in the adequacy of some recent generic definitions. Indeed, it is doubtful whether this species should not go into the genus *Eudistyla*. The entire structure of the collar agrees closely with Miss Bush's description of the organ in that genus; the uncini and setæ are almost counterparts, and Johnson's figures of those of *Eudistyla* (*Bispira*) *polymorpha*, with which the preliminary determination associated these specimens, would answer almost equally well for the present species. The eyes and the dorsal wings of the palpi or branchial bases are also features of similarity. But the absence of any pronounced ventral prolongation of the branchial bases and the total absence of a spiral twist to the latter, in the writer's opinion, more than overbalance those more trivial characters. The shortness of the branchiæ may suggest the possibility of their having been injured and in process of regeneration, but a careful study has brought to light many reasons for rejecting this view.

The type and co-type were taken July 11, 1903, at station 4,247 in Kasaan Bay, Prince of Wales Island, in 95-114 fathoms, in a bottom of mixed mud, sand and broken shells.

***Pseudopotamilla ocellata* sp. nov.** Pl. XXXVII, figs. 8 to 14.

From the other species described in this paper the present is distinguished by its great length and numerous and conspicuous eyes. The type measures 130 mm., of which the branchiæ are 18 mm. and the thorax 11 mm. long. A still larger specimen from the same station is nearly 20 mm. longer.

The branchial bases are stiff, high and prominent, of uniform height, provided dorsally with notched wings, and ventrally with a slightly involute thin membrane. Full-grown specimens possess 21 to 24 pairs of branchiæ, small ones 60 mm. long from 17 to 20. They are moderately long, the dorsal somewhat exceeding the ventral, and entirely without a connecting membrane. The stems are rather stout, rounded externally and provided with a slightly raised line on each margin just external to the bases of the barbs. The latter are rather short and well separated toward the base of the stems, but near the distal end become very slender, about three times as long as the basal ones and much crowded, leaving a very short thick tip of the stem which also bears minute budding barbs of decreasing length almost to the extreme end.

Very conspicuous are the rich dark brown eyes, which are very uniform in size and large (about  $\frac{1}{2}$  the diameter of the stem), elevated and bulging; all are on the margin of the external surface that lies nearest

to the dorso-median line when the branchiæ are spread. They exhibit the usual irregularity in arrangement, but on the ventral branchiæ all are situated on the proximal  $\frac{1}{3}$  and on the dorsal on the proximal  $\frac{1}{2}$  half of the stem, except that on the two dorsalmost they are even more extensively distributed. The ventral stems commonly bear 5 or 6 eyes, occasionally as few as 3, usually distant or in couples. On the dorsal half of the circle of branchiæ each shaft bears from 7 to 12, even the latter number being exceeded on the dorsalmost pair. Except that they are usually much crowded proximally, they are arranged similarly to the ventral ones.

As in *P. brevibranchiata* the collar is intermediate in form between that of *Eudistyla* and typical *Pseudopotamilla*. The dorsal lobes are broadly rounded and slope caudally from their anterior median margin into the dorso-lateral incision; but they are so largely united with the dorsal surface of the thorax upon which they rest that only the outer portion is free, though to a greater depth than in *P. brevibranchiata*. The lateral portions rise abruptly as prominent lobes just dorsal to the collar setæ, and then continue of nearly even height until they rise directly into the elongated narrow and pointed ventral lobes.

Palpal and oral membranes of the usual form are present and the tentacles have a length about equal to the breadth of the thorax, their basal half being broad and foliaceous and the distal half slender and cirriform.

As a result of having been preserved in the tubes the body is slender, elongated and nearly cylindrical throughout, only a very short region at the posterior end being tapered to the pygidium, while the anterior thoracic region is slightly depressed. Probably as a result of pressure in the tubes, the segments are very faintly separated, except along the glandular ventral plates. Except posteriorly they are rather long, the anterior abdominal and the thoracic ones being from  $\frac{1}{3}$  to  $\frac{1}{2}$  as long as wide. The pygidium is oblique, with two pairs of minute lobes guarding the anus laterally and sometimes a group of numerous small brown specks on each side above. Normally there are 9 thoracic segments, of which 8 are setigerous, though one example has but 7. The abdominal segments vary from 125 on a specimen 60 mm. long to 187 on the largest example, measuring 148 mm.

All of the ventral plates are narrow, nowhere exceeding  $\frac{1}{2}$  the body width and usually much less than this. Corresponding to the form of the segments the extreme posterior ones are 4 times as wide as long; throughout most of the length of the abdomen they are twice as wide as long; and those of the anterior abdominal and most of the thoracic

segments are square, only the first 3 of the latter being again wider and irregular.

Except on the collar the thoracic setæ tufts are oblique and linear, nearly half as long as the corresponding tori, and each guarded by a conspicuous anterior and posterior fold. Tori are relatively short, little exceeding  $\frac{1}{2}$  the distance separating them ventrally, and of remarkably uniform length, the second being slightly the longest and those following decreasing in length to the last. On the abdomen the uncinigerous tori and the setæ tufts lie in nearly the same line, the latter very slightly in advance of the former and but little shorter.

The fecal groove is well marked throughout both thorax and abdomen and passes obliquely across the right side of the first abdominal and last thoracic segments for their entire length.

Collar setæ are all of one form, capillary, acute, curved, narrowly double-winged, not very long. The remaining thoracic fascicles are composed of a small dorsal group of capillary setæ similar to those just described (fig. 8) and a large number of broad-bladed spatulate setæ (fig. 10), forming a close phalanx of several vertical rows. Abdominal setæ are arranged in two vertical rows (about 15 in each on XX), the one with short tips, the other with them more slender and about twice as long (fig. 9). Both have their shafts abruptly bent at the surface of the body, where they are provided with short striated wings of unequal width, beyond which projects the long, slender, acute tip.

Thoracic tori contain the usual two forms of avicular uncini and pennoned setæ, of which there are of each about 45 in each torus of V and 30 on IX. On anterior segments the former have the form shown in fig. 11, except that the beak is usually straighter. The body is long and straight, the breast moderate, the neck rather short, head large and crest prominent and well forward. On the last thoracic segment the uncini (fig. 12) are very much larger and of quite different form, the body being very long and slender, the breast very small, the neck rather long and sloping forward, the head and crest small and the beak less sharply bent downward. Anterior abdominal tori bear about 40 uncini (fig. 13) which are much smaller than the smallest of the thoracic and characterized by the small size of the posterior portion of the body, the large breast, and exceeding high and full crest. The pick-shaped or pennoned setæ (fig. 14) have short stems and slightly enlarged heads with the usual hood and prolonged tip.

Besides a slight tinge of brown about the parapodia, and, on some specimens, 4 to 6 pairs of brown spots, diminishing in size posteriorly, on the dorsum of II to V or VII, there is no pigment on the body. On

the branchiæ there is usually a narrow band of dull purplish-brown on the branchial bases and 3 zones of rich purplish-brown on the basal half of the branchiæ, the lower two of which sometimes coalesce to form a very broad zone covering the entire ocellated region. On the alcoholic specimens this color very little involves the outer surface of the stems, but is deep on their inner surfaces and the barbs. On one specimen the barbs of the basal half of the branchiæ are also largely orange and the pigment of each eye extends as a narrow oblique line in a proximal direction halfway across the outer surface of the stem.

The tubes of this species occur, sometimes singly attached to stones, sometimes in clumps of several wound among one another in an intricate fashion and firmly united. They are thick, of cartilage-like consistency after preservation and usually little encrusted with sand or other foreign substances. In one case the attached surface of the tubes is much infiltrated with calcareous matter.

Specimens occur off Fort Rupert, Vancouver Island (station 4,202), in 25-36 fathoms, on a bottom of gray sand; in Icy Strait (station 4,261), in 10 fathoms, on a bottom of mud and rock; and at Afognak Island (stations 4,269 and 4,270), in 14-19 fathoms, on a bottom of hard sand with rocks. The last station yielded the largest specimens, among them the type.

*Pseudopotamilla intermedia* sp. nov. Pl. XXXVII, figs. 15 to 22.

Of this well-marked species the type alone is known. This is a female filled with eggs and having a total length of 58 mm., of which the branchiæ are 3 mm. and the thorax 7 mm. The thorax is 2 mm. and the anterior part of the abdomen 2.5 mm. wide. There are 158 somites, 10 (9 setigerous) of which are thoracic.

Most noteworthy is the small size of the branchiæ, the extreme length of which is only 3 mm. The entire absence of pigment and the relatively pale color of the eyes suggests the possibility of their being in process of regeneration. The branchial bases are remarkably small, of soft texture, have the distal margin evenly transverse, the ventral margin truncate and not at all elongated or spirally coiled, and the dorsal margin provided with a notched lappet as in *P. brevibranchiata*, but smaller and soft and membranous instead of rigid. Each palpus bears 12 branchiæ, including 2 or 3 rudimentary ventral ones. The longest are only 3 times the height of the base, and only a little more than  $\frac{1}{3}$  of the length of the thorax. In arrangement they are strictly one-ranked, and none is crowded into the interior. The stems are rather stout, rounded on the external face and lack altogether marginal wings and connecting membranes. The barbs are two-ranked, distributed rather



sparsely, the largest about 4 times the diameter of the stem, diminishing in length toward the end, leaving a short thick tip of the stem naked. Never more than 2 eyes, and sometimes one or none, occur on each stem. They are rather small, pale brown, regular in arrangement and always on the proximal half and the dorso-median aspect of the stems of the spread branchiæ. The oral membrane and tentacle are slightly developed, the latter folded longitudinally.

In most respects the collar is typical of the genus. The median dorsal portion is better developed than in *P. brevibranchiata*, but less so than in *P. oculifera* (Leidy); the lateral portions are rather prominent, rising abruptly from just above the collar setæ, and expanding ventrally in broad, prominent lobes separated by the median ventral fissure; on one side a deep notch, on the other a slight one bounds the ventral lobe laterally.

The form is generally slender and cylindrical, the thorax slightly depressed anteriorly, narrower than the anterior region of the abdomen, the posterior half of which tapers very gently to the pygidium, and the anus nearly terminal but surmounted by a small lobe bearing two groups of minute brown eye-spots.

Thoracic setigerous tufts are prominent, the anterior especially elongated and oblique. The uncinigerous tori are very little elevated above the surface, the first and second longest, equalling about  $\frac{1}{3}$  the circumference of the body and separated by an equal ventral distance. From the second they decrease in length, the last scarcely more than  $\frac{1}{3}$  of the first and separated by a ventral distance of about  $\frac{1}{3}$  of the circumference. Abdominal parapodia are rather prominent, especially the ventral setigerous ends, the first about equal to the eighth thoracic and succeeding ones decreasing slowly but steadily to the last.

The ventral glandular plates are narrow on the abdominal region, separated from the parapodia by wide grooves and completely divided into a pair of squares by the deep faecal groove, which turns to the right obliquely across the first and appears again on the dorsum of the anterior part of the thorax, where it opens into the dorsal fissure. It is not visible on the posterior part of the thorax. The thoracic ventral plates are indistinct and poorly developed in the type.

No pigment is present on the greater part of the body, being confined to 4 pairs of discrete reddish-brown spots on the dorsum of somites II to V, which become successively smaller and the last mere specks. Owing to the presence of great numbers of eggs the abdomen is somewhat yellowish.

All setæ have a pale yellow color. Those in the collar tuft are,

like the succeeding thoracic tufts, of two kinds. A few of the dorsalmost are capillary, more or less sigmoidly curved and narrowly winged. The ventral ones, more numerous and arranged in several parallel rows, are of the mucronate-spatulate type, but have a somewhat narrower and longer obovate blade than those on the following somites. On remaining thoracic somites the setæ are more numerous, the capillary (fig. 15) forming a projecting tuft, the spatulate (fig. 17) in more and longer rows and having somewhat shorter and broader blades than those on the collar; the mucronate tip is long and slender. Abdominal setæ are in two vertical rows, 9 or 10 in each row of the first few fascicles and 4 or 5 in the less distinctly 2-ranked fascicles of the caudal end. Both kinds have the shaft abruptly bent just beyond the surface of the body, the longer form with a very narrow accessory wing on the concave side and a wider but very short wing on the convex side, and the smooth acute tip often much longer than in the seta figured. The short setæ (fig. 16) are sigmoidly curved, have shorter, smooth tips and broader, strongly striated wings reflexed from the convex side.

Thoracic tori bear avicular uncini in the posterior and pick-shaped setæ in the anterior row. The former (fig. 18) have long straight bodies, moderate-sized breasts, rather short, erect necks, enlarged heads, prominent crests very low in front, and curved beaks. On the last, and possibly other posterior, thoracic somites the uncini (fig. 19) are very much larger, with very long bodies, minute breast, long neck well sloped forward, head not enlarged, very small crest and weak beak. Another less typical one with somewhat larger crest is shown in fig. 20; 43 occur in the 9th and 60 in the 4th torus, though the latter occupy twice as long a space. The pick-shaped setæ have the form shown in fig. 22, the heads being much reduced and the hoods much inflated and with slender tips about as long as the beaks of the uncini. Abdominal aviculae (fig. 21) are much smaller than the thoracic, with relatively shorter bases, larger breast, short thick neck, and crest larger, farther forward and extending low down on the beak, which has a straight profile.

One specimen only known, from station 4,267, off Cape Edgecumbe, Sitka Sound, 922 fathoms, on a bottom of soft gray mud.

*Pseudopotamilla splendida* sp. nov. Pl. XXXVII, figs. 23 to 27.

This large handsome species is founded on two specimens lacking the posterior end; with the 37 anterior segments alone the type measures 65 mm. long, 27 mm. belonging to the branchiæ and 8 mm. to the thorax including the collar, while the greatest width of the thorax, exclusive of the setæ, is 5 mm.

The branchial lobes are very small, barely reaching the border of the collar, stiff, thick, very little free, lacking all trace of the dorsal appendage or lappet of some species; the ventral end lower, not at all produced nor involute, without a thin membrane, and partly united to its fellow of the opposite side. Twenty-two pairs of branchiæ are present in each specimen. Except that those of one side are in process of regeneration all are of approximately equal length and are entirely separate to the base. The external surface of the stems is wider than the internal, flattened and provided with lateral angles but no wings. There is no indication of eyes. The barbs are numerous and closely arranged in 2 ranks; they increase in size regularly from the base for  $\frac{3}{4}$  the length of the stem, those at the distal end of this region being 3 times the length of the basal ones and  $\frac{1}{2}$  the width of the thorax; in the distal  $\frac{1}{4}$  they again decrease, leaving a filamentous tip equal to the basal barbs. Several of the basal barbs of the dorsalmost branchiæ are much enlarged.

The conspicuous, flaring collar has very large dorsal lobes, separated by the dorsal fissure and bounded laterally by large, deep incisions midway between the dorsal fissure and the collar setæ; these dorso-lateral incisions are partly filled by a small, thin lobe arising from the bottom. The lateral portion of the collar rises in an even curve to the same height as the dorsal lobe, its margin is slightly wavy but not at all notched nor produced into ventral lobes, but instead is broadly rounded below and overlaps the ventral fissure from both sides.

Oral membranes are prominent, but present no characteristic features. The tentacles slightly exceed the collar in length and have a thick midrib tapering to a free end, the basal half being provided on each side with broad margins folded together.

On a specimen preserved outside of the tube the thorax is broad and depressed and tapers regularly from the collar segment into the more slender terete abdomen. The second example, having been removed from a tube after preservation, is more nearly cylindrical throughout. All segments are very distinctly indicated and uniannulate. The type possesses 9 thoracic (8 setigerous) and 28 remaining abdominal segments; another specimen has 10 thoracic (9 setigerous) and 58 abdominal segments, both, of course, being incomplete.

Although the dorsal fissure is deep on the anterior 2 thoracic segments, the faecal groove is not discernible on the thorax. On the abdomen it is deep and conspicuous, and can be traced around the right side of the first abdominal segment until it disappears in the furrow anterior to the setæ.

The thoracic setigerous tubercles have short bases but project prominently. The tori are very long, the first about twice and the last about  $1\frac{1}{4}$  times the ventral interspace, the others intermediate. On the abdomen the same parts are little elevated and placed at nearly the same level as the dorsal end of the last thoracic. The setigerous line is shorter than the thoracic and the first torus about  $\frac{1}{4}$  as long as the last thoracic. About 90 aviculæ and the same number of pick-shaped setæ occur on the torus of III and 60 of each on IX. On the thoracic segments the spatulate setæ are very numerous and arranged in 5 or 6 vertical rows, while the capillary setæ do not exceed about 15. The capillary abdominal setæ are in two regular rows of about 10 each on the anterior segments.

All of the collar setæ and the dorsalmost setæ on the other thoracic segments are rather short, stout, capillary, tapered to an acute tip, little curved and with small, nearly symmetrical wings with very fine oblique striæ on each side. The spatulate setæ (fig. 24) have stout stems and rather long, narrow curved blades about  $2\frac{1}{2}$  times as long as wide with apical arms of moderate length. The abdominal setæ of both rows do not differ greatly in length. They are longer than the thoracic capillary setæ, especially posteriorly, and are gracefully curved and tapered, with fairly broad, oblique, strongly striated and nearly symmetrical wings (fig. 23). Avicular uncini are nearly uniform in size and form on all thoracic segments. They (fig. 25) have moderately long curved bodies, full breasts, slender upright necks, elevated crests and slender acute beaks. Abdominal avicular uncini (fig. 26) are smaller and have very small bodies and deeper breasts but are otherwise similar. The pick-shaped thoracic setæ have the form shown in fig. 27.

Pigment is totally absent from the body and on the branchiæ exists only as six regular, narrow zones of pale reddish-brown, chiefly confined to the basal halves of the barbs and scarcely apparent on the stems.

The tubes are nearly straight, thick, pale brown and very little incrustated with sand or other foreign matter.

Known only from two large specimens taken at station 4,245, Kasaan Bay, Prince of Wales Island, June 11, 1903, in 95-98 fathoms, on a bottom of dark green mud and sand mixed with shell and rock fragments.

*Pseudopotamilla anoculata* sp. nov. Pl. XXXVII, figs. 28 to 33.

This handsome species has the branchial bases exactly as in *P. splendida*, that is, they are very small and concealed by the collar, somewhat coalesced ventrally, and lack the dorsal lappet, ventral membrane and

any indication whatever of a ventral involution. There are 15 pairs of plume-like branchiæ, each very long and graceful and without any trace of an interbranchial membrane. The stems are more convex externally than those of *P. splendida*, but still distinctly flattened, and there is no trace of eyes. The barbs are all very slender, 2-ranked, well separated and increase regularly in size from very short ones at the base to very long ones, much exceeding the diameter of the thorax toward the end; in the distal  $\frac{1}{4}$  they again decrease, leaving a short tip entirely free from them.

The dorsal lobes of the collar are narrow and very long, considerably exceeding the second segment in length, with nearly parallel sides and rounded ends, the two separated by a wide dorsal fissure. The dorso-lateral notches are very deep but narrow and not occupied by a small lobe. Laterad of the notches the collar rises nearly to the height of the dorsal lobes, which it somewhat overlaps by means of low, broad extensions toward the median line. The remainder of the margin is even and scarcely crenulate, the ventral lobes arising regularly and gradually, without the formation of any notch, into prominent triangular lobes overlapping the bases of the branchiæ and separated by a deep median fissure.

The single example is fortunately complete. It measures 122 mm. long, the thorax being 15.5 mm. and the branchiæ 32 mm. long, and the former 3.5 mm. wide. It is consequently long and slender, tapering to the pygidium in the posterior  $\frac{1}{3}$ . There are 14 (13 setigerous) thoracic somites and 162 abdominal somites. The former region is scarcely depressed and the remainder of the body nearly cylindrical from pressure of the tube. Besides being unusually broad and deep anteriorly the dorsal fissure is prolonged into a fæcal groove extending for nearly the length of the thorax, but gradually fading out behind. The thoracic segments are  $\frac{1}{2}$  as long as wide, the middle abdominal about  $\frac{1}{6}$  as long as wide, and the posterior very much shorter. Ventral plates are developed much as in *P. splendida*, but the thoracic are relatively longer and the lateral notches divide them unequally, being nearer to the posterior border; the anterior abdominal plates are twice as wide as long and the posterior 4 times or more, all very thick and deeply divided; none of the abdominals are notched laterally, and they occupy about  $\frac{1}{3}$  of the body width.

Thoracic setæ tufts are short and straight, the anterior ones placed at a very high level. The tori of III have a length of nearly  $\frac{1}{4}$  the circumference of the body and are separated by ventrally  $\frac{1}{2}$  this distance. From the first they decrease in size regularly, the last and shortest

being but  $\frac{1}{3}$  as long as the first. The first abdominal torus is not more than  $\frac{1}{2}$  as long as the last thoracic, and is on the level of the thoracic setæ tufts. The first thoracic torus bears 65 uncini and an equal number of pick-shaped setæ, the fifth 43 and the last 33. Anterior abdominal tori have about 25 uncini and the setæ tufts about 15 setæ, less distinctly in 2 rows than in other species.

All of the collar setæ and the dorsalmost setæ of other thoracic fascicles are of the usual slightly curved, acute, tapering form with short, rather narrow, obliquely striated wings which arise at an angle with the stem. Not over about a dozen occur in each fascicle. Spatulate setæ (fig. 30) are much less numerous than in *P. splendida*, and arranged in only 2 or 3 vertical rows. The wings are decidedly long, the entire expanded region being 3 times as long as wide, with an apical arm exceeding in length its greatest diameter. The striation of the blade is unusually faint. Abdominal setæ (figs. 28, 29) are few (about 15 in anterior tori), not distinctly arranged in two rows, and the longer and shorter ones not greatly different. The stem is constricted but not sharply bent at the base of the blade.

Avicular uncini (fig. 31) of similar form occur throughout the thoracic region. The base is only moderately elongated and slightly curved, the breast rather prominent, the neck moderately long and sloped forward, the crest well forward and forming a straight profile with the slender acute beak. Abdominal uncini (fig. 32) are much smaller, with very short bodies slightly curved downward posteriorly, the breast deep and full, neck and crest similar to those of the thoracic uncini, but the beak much shorter and smaller. The pick-shaped or pennoned setæ (fig. 33) have slightly curved stems, elongated flattened heads, very difficult to see clearly, and high compressed hoods drawn out at a wide angle with the stem into delicate pennants.

No color remains except on the branchiæ, the ventral ones of which have 6 or 7 rich wine-color spots on the barbs and slightly on the stems. On some of the dorsal branchiæ these spots coalesce so that they are chiefly colored, with a few irregular white spots at the base and a more extensive white region toward the tip.

The tube is dark colored, rough, brittle and covered with sand.

This species is known from the type only, taken June 7, at station 4,230, in the vicinity of Naka Bay, Behm Canal, on a rocky bottom, in 108 to 240 fathoms.

## EXPLANATION OF PLATE XXXVII.

(All figures are magnified 250 diameters.)

*Pseudopotamilla brevibranchiata*, figs. 1 to 7.

- Fig. 1.—Dorsal thoracic capillary seta from somite VI.
- Fig. 2.—Long abdominal capillary seta from somite XX.
- Fig. 3.—Spatulate thoracic seta from somite VI.
- Fig. 4.—Thoracic avicular uncinus from somite VI.
- Fig. 5.—Abdominal avicular uncinus from somite XX.
- Fig. 6.—Pick-shaped seta from somite VI.
- Fig. 7.—Another view of the end of the same.

*Pseudopotamilla ocellata*, figs. 8 to 14.

- Fig. 8.—Dorsal thoracic capillary seta from VI.
- Fig. 9.—Long abdominal capillary seta from XX.
- Fig. 10.—Spatulate thoracic seta from VI.
- Fig. 11.—Thoracic avicular uncinus from VI.
- Fig. 12.—Thoracic avicular uncinus from IX.
- Fig. 13.—Abdominal avicular uncinus from XX.
- Fig. 14.—Pick-shaped uncinus from VI.

*Pseudopotamilla intermedia*, figs. 15 to 22.

- Fig. 15.—Dorsal thoracic capillary seta from VI.
- Fig. 16.—Short abdominal capillary seta from XX.
- Fig. 17.—Spatulate thoracic seta from VI.
- Fig. 18.—Thoracic avicular uncinus from VI.
- Fig. 19.—A typical avicular uncinus from the last thoracic somite (X).
- Fig. 20.—Portion of another from the same torus showing a larger crest.
- Fig. 21.—Abdominal avicular uncinus from XII.
- Fig. 22.—Pick-shaped seta from somite VII.

*Pseudopotamilla splendida*, figs. 23 to 27.

- Fig. 23.—Long abdominal capillary seta from XXI.
- Fig. 24.—Spatulate thoracic seta from VI.
- Fig. 25.—Thoracic avicular uncinus from VI.
- Fig. 26.—Abdominal avicular uncinus from XX.
- Fig. 27.—Pick-shaped seta from VI.

*Pseudopotamilla anoculata*, figs. 28 to 33.

- Fig. 28.—A shorter abdominal capillary seta from XXVI.
- Fig. 29.—Face view of the bladed portion of the same.
- Fig. 30.—Spatulate thoracic seta from VI.
- Fig. 31.—Thoracic avicular uncinus from VI.
- Fig. 32.—Abdominal avicular uncinus from XXVI.
- Fig. 33.—Pick-shaped seta from VI.